#### DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

# RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

#### **Current Human Exposures Under Control**

Facility	Name:

Bay Zinc Co. Inc.

Facility Address:

301 W. Charron Rd., Moxee City, WA 98936

Facility EPA ID#:

WAD027530526

Has all available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?							
_X_ If yes - check here and continue with #2 below.							
If no - re-evaluate existing data, or							
if data are not available skip to #6 and enter "IN" (more information needed) status code							

#### BACKGROUND

#### **Definition of Environmental Indicators (for the RCRA Corrective Action)**

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

#### **Definition of "Current Human Exposures Under Control" EI**

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

#### Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

#### Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

## Current Human Exposures Under Control Environmental Indicator (EI) RCRIS code (CA725)

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2.	Are groundwater, soil, surface water, sediments, or air media known or reasonably suspected to be "contaminated" above appropriately protective risk-based "levels" (applicable promulgated standards, a well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?						
·	Groundwater Air (indoors) <sup>2</sup> Surface Soil (e. Surface Water Sediment Subsurf. Soil (e. Air (outdoors)	g., <2 ft)	Yes X X X	No	2	Rationale / Key Contaminants chloride, sulfate, cadmium, zinc, manganese cadmium, lead, zinc, dioxin cadmium, lead, zinc, dioxin	
	X	appropri that thes If yes (for "contame determinal supporti	iate "leveled or any mainated" nation the ing docu	els," and as" are not nedia) - comedium, at the mementation	reference exceedentinue a citing ap dium co	after identifying key contaminants in each oppropriate "levels" (or provide an explanation for the uld pose an unacceptable risk), and referencing	
Ration	ale and Reference(		own (for	any medi	ia) - skip	to #6 and enter "IN" status code.	
	Soil:	Contam Cadmiu Lead Zinc Dioxin			kg /kg mg/kg (	570 mg/kg for ecological impacts) on (total dioxin via TEF method)	
	Groundwater:	Contam Chloride Sulfate Cadmiu	е	Cleanu 250 mg 250 mg 0.005 r	/l /l		

References:

1) Remedial Investigation/Voluntary Cleanup Plan; June 2002

5.0 mg/l

0.05 mg/l

2) Draft Cleanup Action Report; Sept. 2005

Zinc

Manganese

#### Footnotes:

<sup>&</sup>lt;sup>1</sup> "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

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3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

#### Potential Human Receptors (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	no	no	no	yes			no
Air (indoors)							
Soil (surface, e.g., <2 ft)	no	yes	no	yes	yes	no	no
Surface Water							
Sediment				•			
Soil (subsurface e.g., >2 ft)				yes			no
Air (outdoors)—				-			

Instructions for Summary Exposure Pathway Evaluation Table:

- 1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.
- 2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("\_\_\_"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

 skip to in-plac each co	pathways are not complete for any contaminated media-receptor combination) - #6, and enter "YE" status code, after explaining and/or referencing condition(s) e, whether natural or man-made, preventing a complete exposure pathway from ontaminated medium (e.g., use optional <u>Pathway Evaluation Work Sheet</u> to analyze pathways).
X	If yes (pathways are complete for any "Contaminated" Media - Human Recentor

combination) - continue after providing supporting explanation.

If unknown (for any "Contaminated" Media - Human Receptor combination) - skip to #6 and enter "IN" status code

Rationale and Reference(s):

- 1) Remedial Investigation/Voluntary Cleanup Plan; June 2002
- 2) Draft Cleanup Action Report; Sept. 2005

<sup>&</sup>lt;sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

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4	Can the <b>exposures</b> from any of the complete pathways identified in #3 be reasonably expected to be " <b>significant</b> " (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?				
••	_ <b>x</b> _	If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."			
		If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."			
	<del></del> .	If unknown (for any complete pathway) - skip to #6 and enter "IN" status code			
-	Rationale and Re	eference(s):			
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<sup>&</sup>lt;sup>4</sup> If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

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	If yes (all "significant" exposures have been shown to be within acceptable limits) - continue and enter "YE" after summarizing <u>and</u> referencing documentation justifying whall "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
	If no (there are current exposures that can be reasonably expected to be "unacceptable")- continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.
	If unknown (for any potentially "unacceptable" exposure) - continue and enter "TN" status code
Rationa	le and Reference(s):
ranona	le and Reference(s):

#### Current Human Exposures Under Control Environmental Indicator (EI) RCRIS code (CA725) Page 6

Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event	code
(CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination	below
(and attach appropriate supporting documentation as well as a map of the facility):	

and attach appr	opriate supporting documentation as well as a map of the facility):
_X_	YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at  Bay Zinc Co. Inc.  EPA ID # WAD027530526  330 W. Charron Rd.  Moxee City, WA 98936  under current and reasonably expected conditions. This determination will be reevaluated when the Agency/State becomes aware of significant changes at the facility.
***************************************	NO - "Current Human Exposures" are NOT "Under Control."
palament and the second	IN - More information is needed to make a determination.
Completed by	Greg Caron Site Manager, Hydrogeologist
Supervisor	Date 9/6/06  Brian Dick  HWTR Supervisor

Locations where References may be found:

6.

Washington State Department of Ecology Central Regional Office 15 W. Yakima Ave. #200 Yakima, WA 98902

Washington State Dept. of Ecology

Contact telephone and e-mail numbers

Greg Caron 509-454-7893 grca461@ecy.wa.gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

#### **DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION**

Interim Final 2/5/99

#### **RCRA** Corrective Action Environmental Indicator (EI) RCRIS code (CA750)

#### Migration of Contaminated Groundwater Under Control

•	Name: Address: EPA ID#:	Bay Zinc Co. Inc. 301 W. Charron Rd., Moxee City, WA 98936 WAD027530526
1.	groundwater n	ole relevant/significant information on known and reasonably suspected releases to the nedia, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units gulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?
	X	_ If yes - check here and continue with #2 below.
		If no - re-evaluate existing data, or

if data are not available, skip to #8 and enter"IN" (more information needed) status code.

#### **BACKGROUND**

#### <u>Definition of Environmental Indicators (for the RCRA Corrective Action)</u>

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

#### Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

#### Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., nonaqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

#### **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2	Is groundwater known or reasonably suspected to be "contaminated" above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?
	X If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.
	If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
	If unknown - skip to #8 and enter "IN" status code.
	Rationale and Reference(s):
	<ol> <li>Remedial Investigation/Voluntary Cleanup Plan; June 2002</li> <li>Draft Cleanup Action Report; Sept. 2005</li> <li>Draft Annual Water Wells Report; Jan. 2006</li> </ol>

#### Footnotes:

<sup>1</sup>"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

3.	expected to rema	on of contaminated groundwater stabilized (such that contaminated groundwater is in within "existing area of contaminated groundwater" as defined by the monitoring ated at the time of this determination)?
	X_	If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination".
		If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination" <sup>2</sup> ) - skip t #8 and enter "NO" status code, after providing an explanation.
		If unknown - skip to #8 and enter "IN" status code.
Rationa	ale and Reference(s	3):

- 1) Remedial Investigation/Voluntary Cleanup Plan; June 2002
- 2) Draft Cleanup Action Report; Sept. 2005
- 3) Draft Annual Water Wells Report; Jan. 2006

<sup>&</sup>lt;sup>2</sup> "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. The Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Does "contaminated" groundwater discharge into surface water bodies?		
If yes - continue after identifying potentially affected surface water bodies.		
X If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.		
If unknown - skip to #8 and enter "IN" status code.		
Rationale and Reference(s):		
1) Remedial Investigation/Voluntary Cleanup Plan; June 2002		
2) Draft Cleanup Action Report; Sept. 2005		
3) Draft Annual Water Wells Report; Jan. 2006		

5.	Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration <sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?			
		If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration <sup>3</sup> of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.		
	***************************************	If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration <sup>3</sup> of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations <sup>3</sup> greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.		
		If unknown - enter "IN" status code in #8.		
	Rationale and Re	eference(s):		
	***************************************			
	***************************************			
	<del></del>	·		

<sup>&</sup>lt;sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

	If yes - continue after either: 1) identifying the Final Remedy decision incorporating the conditions, or other site-specific criteria (developed for the protection of the site's surfawater, sediments, and eco-systems), and referencing supporting documentation
	demonstrating that these criteria are not exceeded by the discharging groundwater; OR  2) providing or referencing an interim-assessment, appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and
A	final remedy decision can be made. Factors which should be considered in the interimassessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.
	If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.
	If unknown - skip to 8 and enter "IN" status code.
Rationale and R	eference(s):
***************************************	

could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface

water bodies.

<sup>&</sup>lt;sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7.	Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"			
		_X	If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."	
			If no - enter "NO" status code in #8.	
			If unknown - enter "IN" status code in #8.	
Rationa	le and Re	eference(s	s):	
		2) Com	ped Order 02HWTRCR#4661; Aug. 2002 pliance Monitoring Plan; Oct. 2002 t Annual Water Wells Report; Jan. 2006	

_		elow (attach appropriate supporting documentation as well as	· · · · · · · · · · · · · · · · · · ·		
-	X				
	•	verified. Based on a review of the information contained in			
•		determination, it has been determined that the "Migration of Contaminated			
•		Groundwater" is "Under Control" at the			
		Groundwater" is "Under Control" at the	, located		
	•	at Specifical	ly, this determination		
		indicates that the migration of "contaminated" groundwater			
		that monitoring will be conducted to confirm that contamin	-		
		remains within the "existing area of contaminated groundw determination will be re-evaluated when the Agency become			
		significant changes at the facility.	iles aware of		
		significant changes at the facility.			
		NO - Unacceptable migration of contaminated groundwat	er is observed or expected.		
		IN - More information is needed to make a determination.			
	•		01 01		
	Completed by	Date	9/6/06		
		Greg Caron	•		
		Site Manager, Hydrogeologist			
•	<b>a</b> .	20-	9/6/08		
	Supervisor	Date Disk	<del></del>		
-	4	Brian Dick HWTR Supervisor			
		Washington State Dept. of Ecology			
		washington State Dept. of Ecology			
	Locations where References may be found:				
		Washington State Department of Ecology			
	•	Central Regional Office			
	•	15 W. Yakima Ave. #200			
	•	Yakima, WA 98902			

Contact telephone and e-mail numbers

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